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ART. XI.—*Reptilian Notes:*

Megalania prisca, Owen, and Notiosaurus dentatus, Owen; Lacertilian dermal armour; Opalized remains from Lightning Ridge.

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(With Plate VIII.).

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1.—The Identity of Megalania (vel. Varanus) prisca, Owen, with Notiosaurus dentatus, Owen. (Pl. 8, Figs. 1-4).

The late Mr. Richard Lydekker remarked:—"Sir R. Owen has described two peculiar blunt and pleurodont teeth of a large lizard from the Pleistocene of Queensland under the name of *Notiosaurus*, which is, however, preoccupied by the genus *Notosaurus*. . . . It is just possible that the teeth may be referable to *Varanus priscus*, in which event the generic name *Megalania* would have to be retained for that form."[1]

I am now in a position to materially confirm Mr. Lydekker's astute conjecture. The Australian Museum has long been in possession of numerous vertebrae, undoubtedly those of Owen's *Megalania prisca* from fluviatile deposits near Clifton Station, King Creek, Condamine River.

Associated with these, like in appearance, colour, and condition of petrifaction, are a few limb bones, and the larger portion of a right dentary, with part of a tooth *in situ;* there can be no reasonable doubt that these remains all belonged to one and the same species of reptile.

This dentary portion (Pl. 8, figs. 1 and 2) is fractured in front at about the premaxillary suture, and as preserved measures six and a-half inches in length. Posteriorly it is also fractured contiguous to the prefrontal-lachrymal sutures, so that nearly the whole of the bone is preserved. On the external surface (Pl. 8, fig. 1) are visible six large foramina of the maxillary artery branches (anterior branch of external carotid). On the anterior aspect along the alveolar

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1 Lydekker. Nicholson's Man. Pal., 3rd Edit., ii., 1889, p. 1142. A suspicion of this appears to have occurred to the late Mr. C. W. de Vis (Proc. Roy. Soc. Queensland, vi., 1890, p. 97).

channel are the concave surfaces of attachment of seven pleurodont teeth (Pl. 8, fig. 2), another with the dental tissue remaining on it, and the base of a ninth, the tooth fractured transversely, and displaying the pulp cavity. At the base of the tooth represented by dental tissue may be seen the foramen leading into the space in which a new successional tooth would be developed.[1]

The dental impressions (Pl. 8, fig. 2) along the alveolar channel average one and three-eighth inches vertically by five-eighths of an inch transversely, but the immediate surface of tooth attachment averages six-eighths by five-eighths. The base of the remaining tooth is longitudinally grooved as in the better of the two figured by Owen as *Notiosaurus dentatus*,[2] indicating the inflected folds of the external cement.

There are six foramina on the exterior of the dentary of the maxillary artery branches, the second in retiring order double, the sixth and last again double, but the two meati are united whilst still exhibiting evidence of a former separation. This posterior "dumb-bell"-shaped foramen enlarges inwards and upwards immediately beneath the lachrymal bone (Pl. 8, fig. 1).

In the Water Monitor (*Varanus salvator*) these foramina are nine in number. The posterior terminal is simply transversely elongated instead of dumb-bell shaped, and it is the most anterior, instead of the second anterior as in *Megalania*, that is double. In the Australian *V. varius*, Shaw, there are again nine foramina, all single, and the posterior opening as in *V. salvator*.

Notiosaurus dentatus, from Cuddie Springs, New South Wales, it is true, was established[3] by Owen on a mere fragment of the dentary element of a mandibular ramus with portions of two teeth, but the form of these teeth, method of implantation against the alveolar wall, and nature of the cement infoldings are so essentially those of the dentary portion accompanying the *Megalania* vertebrae, that I have no doubt of their identity. I very much doubt if the tooth figured by Mr. de Vis as *Notiosaurus dentatus*[4] is in any way related to Owen's fossil of the same name.

The words of Owen, in describing the dentition of the Crocodilian Monitor (*V. crocodilinus*) apply so well to the present specimen, that I cannot refrain from quoting them. The teeth "are anchylosed by the whole of their base, and by an oblique surface leading up-

1 Tims. Tomes' Man. Dental Anatomy, 7th Edit., 1914, p. 310.
2 Owen. Phil. Trans., 175, pt. i., pl. 12, fig. 2*b*.
3 Owen. Ibid., p. 249.
4 De Vis. Proc. Roy. Soc. Queensland, ii., 1886, pl. iii., fig. 2.

wards on the outer side of the tooth to a slight depression on the oblique alveolar surface as in *Var. striatus.* . . . The alveolar channel or groove has scarcely any depth; but the anchylosed base of the tooth is applied to an oblique surface, terminating in a sharp edge, from which the outer side of the free crown of the tooth is directly continued."[1]

2.—Megalania prisca, a Cave Fossil. (Pl. 8, Figs. 3 and 4).

A few months ago I received a small consignment of bones from the ossiferous deposit at the Wellington Caves Reserve. For some time past a commercial venture, known as the "New South Wales Phosphate Co. Ltd.," has operated on a portion of the area in question. From vugs, vertical crevices, the latter possibly leading to unexplored cave-chambers, and shaft exploration, a large quantity of ossiferous material in red cave-earth has been extracted.[2] To the courtesy of Mr. George Dixon, of the above company, the Trustees are indebted for a small collection of bones from one or other of these openings.

Amongst the specimens my attention was at once attracted by a large vertebra more or less enclosed in red earth. On being freed from the latter, it was found to correspond in every detail with the dorsal vertebrae forming a portion of the series already referred to from near Clifton Station.

The neural spine (Pl. 8, fig. 3) is broken off immediately above the level of the post-zygopophyses, only the right hand one of which approaches entirety. The pre-zygopophyses are also fractured, the left being the more complete. As compared with Owen's dorsal figure,[3] the pre-zygopophyses are relatively lower in position, and nearly on a level with the upper margin of the ball articular surface of the centrum. Again, the posterior zygopophyses appear to have a more solid base than those in the figure quoted. On the right side of the bone the transverse process is practically complete, and would seem to be constructed on somewhat more solid lines than in the type examples.

The articular ball of the centrum is very convex and projecting (Pl. 8, fig. 4). The neural canal is distinctly broad-oval at the posterior end, as usual in this reptile, and at the opposite or

1 Owen. Odontography, pt. ii., 1841, p. 265.

2 Carne: "Phosphate Deposits in Limestone Caverns in New South Wales." Ann. Rept. Dept. Mines N.S. Wales for 1914 (1915). p. 191, plan, etc.

3 Owen. Phil. Trans., 171, pt. iii., pl. 34.

anterior end is wide transversely. The following are the principal measurements :—

		inches.
Length of centrum	- - - - - -	3
Breadth of the same behind the ball	- - - -	$1\frac{3}{4}$
Vertical, or longitudinal, diameter of ball	- - -	$1\frac{1}{2}$
Transverse ditto	- - - - - - -	$1\frac{5}{8}$
Vertical, or longitudinal, diameter of centrum	- - -	$1\frac{3}{8}$
Fore and aft diameter of cup	- - - - -	$1\frac{1}{8}$
Transverse diameter of cup	- - - - -	$1\frac{7}{8}$
Transverse diameter of anterior outlet of neural canal	- -	$\frac{5}{8}$
Transverse diameter of posterior ditto	- - - -	$\frac{4}{8}$

The remains of *Megalania prisca*, inclusive of *Notiosaurus dentatus*, have now been found in fluviatile, mound spring and cave deposit, as follows :—

Fluviatile deposits - -	Condamine River and its branches (King Creek, &c.), Queensland; "Near Melbourne,"[1] Victoria; South Australia; Castlereagh River, N. S. Wales.
Mound Spring deposit -	Cuddie Springs, East of Gulgongong, N. S. Wales.
Cave deposits - - -	Wellington Caves Reserve, N. S. Wales.

3.—Lacertilian Dermal Armour. (Pl. 8, Figs. 6-9).

For two very interesting fragments from the Opal beds of Lightning Ridge, near Walgett, New South Wales, I am indebted to Mr. T. Wollaston, of Adelaide. Both are formed of roughly hexagonal bony pieces (Pl. 8, figs. 6-8), firmly united by their margins in alternate series. Each component plate is limpet-shell-shaped, more or less, obliquely and unequally conical fore and aft, with a backwardly projecting obtuse apex, with a tendency to overlap in a similar direction. One specimen (Pl. 8, figs. 6, 7) is composed of six larger plates, with three smaller along one of its margins forming, as it were, a border. The second specimen (Pl. 8, fig. 8) comprises five plates of a like nature, and again with three smaller marginal pieces.

These plates are thick, of a compact and bony tissue, the structure of the latter displayed on the inner surface; externally they are highly rugose, the rugosities papilla-like, and usually separate from one another, but here and there becoming semi-confluent, with the narrow interspaces between the papilla often pitted. When

1 It would be interesting to know the exact locality.

examined externally, they appear to be separate from one another, but on the inner surface (Pl. 8, fig. 7) all are anchylosed into a solidity. In one instance at least, some of the papillae have run together, forming three radiating lines from the apex to points on the circumference.

When these fragments first came under my notice, I was struck with a general resemblance to the scale armour of some lizards, and as one naturally turns first to the native fauna for comparisons and affinity, the " Shingle-back " or " Stump-tail " (*Trachysaurus rugosus*) claimed attention. This remarkable species is " clothed with an armour of rough, thick, brown scales (Pl. 8. fig. 9), which give it very much the appearance of a living pine cone." In the Shingleback the dermal armour is osseous, with a horny epidermal covering, as usual, but in the present instance the osseous plates only are presented to us.

The living *Trachysaurus* measures some fourteen inches in length, and if these consolidated scutes represent a reptile allied to the Shingle-back, and are to be accepted as a guide to its relative size, it may not have greatly exceeded the latter in dimensions, the largest scutes on the tail of the Shingle-back measure on an average 9×11 m.m., whilst the cross diameters of the fossil plates are 12×13 m.m.

There is agreement between the recent species and the petrified plates in the general outline of the latter, and the granular sculpture, or ornament. On the tail plates there is a tendency to a posterior pointed apex as in the Lightning Ridge fragments, but the markedly conical elevation of the latter is not seen in the scales of *T. rugosus*.

I have already spoken of the smaller plates at the sides of the fossil fragments, and if an examination be made of the creases between the hind limbs and tail of *T. rugosus*, similar small scales will be found bordering the larger lateral ones. From this, I venture to suggest that the Lightning Ridge fragments are from an approximately similar position in the extinct form.

I am unable to compare my specimens with the few Lacertilian dermal scutes known from the Cretaceous elsewhere, both from the absence of comparative material and literature. In the meantime I ask those who may have reptilian material from the Upper Cretaceous of either Lightning Ridge or White Cliffs, to carefully examine it, with the view of throwing further light on a very interesting subject.

4.—Opalised Reptilian Dentary from Lightning Ridge.
(Pl. 8, figs. 10 and 11).

To Colonel R. E. Roth, D.S.O., M.R.C.S.E., the Australian Museum is indebted for sundry reptilian and molluscan remains from the above locality. The most attractive of these is a small dentary (Pl. 8. figs. 9 and 10), posteriorly broken just at the symphasis, and incomplete forward. There are six teeth set in sockets in an alveolar groove, and supported by the outer alveolar wall, in other words, a pleurodont dentition; the entire specimen is one and three-quarter inches long, the bony tissue being wholly converted into ordinary blue-black opal.

The most complete tooth measures five millimetres from the bottom of the alveolar groove to the tooth apex, but at what I take to be the posterior end of the specimen, the socket visible there is quite ten millimetres deep, and as the slightly curved teeth extend to the bottom, it follows that some of them, at least, attained a length of fifteen millimetres; at the anterior end the alveolar groove is shallower, about six millimetres, the bone itself has a maximum width of fifteen millimetres. The teeth are faintly striate to about the middle of their exposed length, and opalisation has removed all trace of osseous structure throughout the specimen.

Our present knowledge of the Australian Cretaceous reptilian fauna is a very limited one. A few Ichthyopterygian and Sauropterygian remains, a Chelonian or two, a Saurischian (*Agrosaurus macgillivray*), Crocodilian scutes, and other dermal scutes of an unknown reptile,[1] possibly Stegosaurian, about complete the list.

In looking round for relatives of this very beautiful little fossil, I was at first led towards the Ichthyopterygians, but being unsuccessful in this direction, I took the precaution of consulting my former colleague, Dr. Smith Woodward, who suggested a provisional reference to the American Cretaceous and imperfectly known genus *Botosaurus*, L. Agassiz. There is certainly a resemblance to Leidy's figures, but there are also discrepancies in the form of the teeth which it will be well to point out.

In *Botosaurus harlani*, Leidy said that one of the teeth had a mammiliform crown and a gibbous fang; another, the penultimate or last tooth possessed a laterally compressed mammiliform crown,

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1 Etheridge. Rec. Austr. Mus., v., No. 2, 1904.

2 Leidy: "Cretaceous Reptiles of the United States." Smithsonian Contrib. Knowledge, 192, 1865, p. 12.